REMARKS

Claims 5-43 and 46-57 have been canceled to expedite prosecution, although Applicants disagree with the rejections in the Office Action of 9 September 2004. Claims 44 and 45 have been amended.

Rejection of Claims 1-34, 44 and 55-57 Under 35 U.S.C. § 112, First Paragraph (Item 1 of Office Action)

Claims 1-34, 44 and 55-57 have been rejected under 35 U.S.C. § 112, first paragraph, "as failing to comply with the enablement requirement." Claims 5-43 and 46-57 have been canceled. Claim 44 has been amended.

Claims 1 and 2 are drawn to methods of reducing the concentration of oxygen in an aqueous solution. Applicants do not need to point out teachings in the art regarding the in vivo therapeutic efficacy of hemoproteins or provide guidance as to how to use in vivo methods of using hemoproteins, as the methods of Claims 1 and 2 are not in vivo methods. Example 3 and Figure 6, and Example 1 and accompanying figures, especially page 43, lines 13-24 of Example 1, provide support for Claims 1 and 2. See also page 38, lines 11-14 and Example 4, especially page 50, lines 9-24, and Figure 9F. One of ordinary skill in the art could take such teachings in the specification and apply them to using a hemoprotein having deoxygenase activity to reduce the oxygen concentration in an aqueous solution.

Claims 3 and 4 are drawn to methods of reducing the concentration of NO in an aqueous solution. Applicants do not need to point out teachings in the art regarding the in vivo therapeutic efficacy of hemoproteins or provide guidance as to how to use in vivo methods of using hemoproteins, as the methods of Claims 3 and 4 are not in vivo methods. Examples 1 and 4 provide support for Claims 3 and 4. See especially page 41, lines 10-18 in Example 1, Figure 9E, page 50, lines 9-24, Figure 9F, and page 38, lines 11-14. One of ordinary skill in the art could take such teachings in the specification and apply them to using a hemoprotein having deoxygenase activity to reduce the oxygen concentration in an aqueous solution.

Claim 44 is drawn to a method of constricting blood vessels in a mammal, comprising administering to the mammal a hemoprotein having deoxygenase activity. Example 5 describes an organ culture model that is used to demonstrate the effect of treatments on blood vessel tone. Rabbit aortic ring segments as used in Example 5 have been used previously to study the effects

of substances on arterial tone. See page 32, line 27 to page 33, line 15. Effects on the rabbit aorta can be extrapolated to in vivo effects in other animals and in humans, as the effect of NO on blood vessel tone is not species-specific.

The conditions used in Example 5 can be used as a starting point by one of ordinary skill in the art to adjust dosages applicable to a particular medical condition. Further experiments can be done by those of skill in the art to optimize conditions for hemoprotein therapy to reduce concentrations of NO and reverse hypotension. See, for example, page 55, lines 3-14, which illustrates a protocol to determine an effective dose. Such optimization of conditions is readily carried out by a person skilled in the art.

Rejection of Claim 45 Under 35 U.S.C. § 112, First Paragraph (Item 2 of Office Action)

Claim 45 has been rejected under 35 U.S.C. § 112, first paragraph, "as failing to comply with the enablement requirement." Claim 45 has been amended.

Claim 45 is drawn to a method of reducing blood flow in a tumor, comprising introducing into the tumor a hemoprotein having deoxygenase activity. Example 6 (page 53, line 11 to page 54, line 9), and further Figure 14 and page 33, lines 16-29, provide guidance to one of ordinary skill in the art in how flavohemoprotein and other hemoproteins having deoxygenase activity can be used to reduce blood flow in a tumor.

The system described in Example 6 is not a xenograft, but rather, a rat-derived tumor grown in a rat. However, the mechanism by which blood flow is reduced by hemoproteins having deoxygenase activity is not species-specific. It does not depend on the expression of particular genes in the rat or metabolic pathways that differ among species. Rather, it is the consumption of NO which produces vasoconstriction in blood vessels of mammals. Therefore, the example provides teachings relevant to humans and animals.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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